shot at the Crocodile River; a white egg was also found in the nest of a Cape wagtail, which was allowed to hatch to make identity certain; further, we took a white egg from the nest of the little red-vented tit-babbler. . . . The usual host is the Cape sparrow, both of us having taken the cuckoo's eggs—coloured like those of the sparrow—from the nests of this bird." Unfortunately, there is no information as to whether there are "white-egged" and "coloured-egged" strains of cuckoos in Africa, or whether the same bird may lay white or coloured eggs according to circumstances.

FIG. 2.—Black-shouldered Kite. From "Sketches of South African Bird-life."

The book is a welcome addition to South African ornithological literature.

THE ROYAL SOCIETY'S CONVERSAZIONE.

THE first of the two conversaziones given annually by the Royal Society was held at Burlington House on Wednesday of last week, May 13. The guests were received by Lord Rayleigh, president of the society, and included leading representatives of many branches of intellectual activity. There were a large number of exhibits, illustrating methods and results of recent scientific work, and in the course of the evening demonstrations were given in the meeting room by Mr. C. V. Boys, F.R.S., on the dynamics of the game of diabolo, Mr. Francis Fox, on the operations involved in the saving of Winchester Cathedral and other ancient buildings, and Mr. C. Gordon Hewitt, on the natural history of the house-fly. Following our usual practice, we give a summary, with a few additions, of the descriptive catalogue of exhibits, and so far as possible have grouped together the exhibits referring to related subjects.

The British Contribution to the International Investigation of the Upper Air, 1907-8: The investigation of the upper air under the auspices of the "Commission internationale d'Aérostation scientifique" is now fully organised. This country has taken part in the work unofficially since 1902, and officially since 1904. The investigation as carried on in this country is three-fold. The first part consists in measurements of temperature, humidity, and wind velocity at different levels up to about 10,000 feet, by meteorographs raised by kites. For the second part, automatic traces of the relation between pressure (height) and temperature are obtained by means of meteorographs borne by unmanned balloons (*ballons-sondes*). The balloons are arranged to reach heights up to 22 kilometres in about two hours, and then to burst and descend. The finder is invited to return the instruments and claim a reward. For the third part, the bearing and elevation of small pilot balloons are observed at measured intervals of time by one or two theodolites, and the motion of air currents at different levels is computed from the observations. The exhibits were by Dr. W. N. Shaw, F.R.S., Mr. J. E. Petavel, F.R.S., and Mr. W. A. Harwood, Mr. C. J. P. Cave, Captain C. H. Ley, Mr. Eric S. Bruce, and the Director-General of the Survey Department, Egypt; they illustrated the methods referred to and the results obtained by British investigators.

The Astronomer Royal: (1) Photograph on which the new eighth satellite of Jupiter was discovered by Mr. P. Melotte, showing also the sixth and seventh satellites, and photograph of the ninth satellite of Saturn (Phœbe); (2) diagrams of positions of Jupiter's and Saturn's distant satellites, from photographs taken at the Royal Observatory, Greenwich, with the 30-inch reflector; (3) drawings of the solar corona at the eclipses of 1898, 1900, 1901, and 1905, made by Mr. W. H. Wesley from the original negatives; (4) eclipse of 1901, May 18, from photographs taken in Mauritius, and eclipse of 1905, August 30, from photographs taken at Sfax, Tunisia.—*Solar Physics Observatory, South Kensington:* (1) Enlarged photographs of stellar spectra; (2) spectrum of a sun-spot; (3) spectroheliograph disc photographs, taken in "K" light; (4) photographs of prominences, taken in "K" light; (5) photograph of Aberdeenshire stone circle with Cornish circle for comparison.—*Mr. J. Franklin-Adams:* (1) Machine for counting stars upon the 15 inch by 15 inch plates of the Franklin-Adams chart. As the number of stars upon this chart is estimated at 23,000,000, only special areas—selected by Prof. Kapteyn, of Gröningen—will in the first instance be counted. This machine, by Troughton and Simms, is designed to work with such accuracy that regions adjacent to the selected areas may afterwards be added without omissions or overlappings. (2) Machine for drawing precession lines upon the plates of the Franklin-Adams chart. This machine has been designed to draw to a hundredth of a millimetre, if necessary, precession lines giving star places at epochs 1855, 1875, 1900, and 1925, both in Right Ascension and Declination.

Mr. J. S. Wilson and Mr. W. Gore: India-rubber models and apparatus used for the investigation of the distribution of stress in dams (Fig. 1). The model, which rests on the top of the trestle, consists of a slab of india-rubber cut to represent the section of a masonry dam, together with its foundation and substratum. The water pressure against the dam is reproduced by plates pulled against the upstream face of the model by cords passing over pulleys and attached to weights. The correct ratio between the density of the fluid represented by that pressure and the density of the masonry (1 : 2·25) is maintained by suspending a large number of weights from pins passing through the model at uniformly distributed points. To obtain strains large enough to measure, both densities are magnified forty times. Photographs are taken of the model and the system of lines ruled on it, one when unstrained

and the other when strained by the various forces. The strains are determined by measuring corresponding lengths and angles on the two photographic negatives by means of the optical projection micrometers which are exhibited. The stresses are calculated from the measured strains by the equations relating them, which have been experimentally verified.

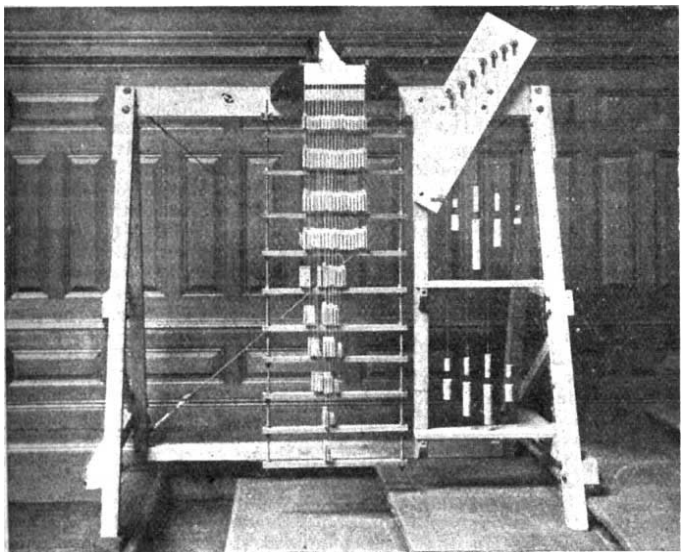

FIG. 1.—India-rubber model and apparatus used for investigations of distribution of stress in dams.

Sir John Thornycroft, F.R.S.: An instrument to indicate the relative rate of turning of two bodies. A sphere supported on two equal revolving cylinders rotates on axes in the same plane as the axes of the cylinders; the angular position of the axis of the sphere depends on the relative velocities of the two cylinders, and is indicated by a hand controlled by a roller touching the sphere.—*Mr. C. V. Boys, F.R.S.:* (1) A modification of the well-known hypocycloidal straight line motion of very simple construction, and requiring guides only $2\sqrt{2}$ (0·6 nearly) inch long for a 4-inch stroke. (2) An artificial horizon in which the mercury is spread out into a very thin film on a surface which it does not wet, its edge being held by deeper mercury in a peripheral trough. The film is adjusted in thickness by means of a floating plunger actuated by a screw. Ripples set up by vibration die out almost instantaneously, and altitudes of stars may be taken in towns where with deeper mercury that would be impossible. The mercury is not contaminated by its dry supporting surface. —*Mr. H. G. King and Mr. R. Kerr:* "Master gauges" or "standards" for extremely accurate measurements, the invention of Mr. C. E. Johansson, of Sweden. By using these gauges separately or combined together, more than 80,000 different sizes can be obtained, any of which sizes are accurate to within 0·00004 inch at 66° F. The steel is so treated as to reduce to a minimum any chance of change after being hardened.—*Prof. H. L. Callendar, F.R.S., and Prof. W. E. Dalby:* Apparatus for m ring temperatures in the cylinder of a gas engine.—*Mr. Goold:* A uniformly symmetrical twin-elliptic penc As the deflector consists of a pair of cross-bars, its can be virtually elongated by fixing the bars at any other than a right angle. By this means any rate of change phase is easily secured. The resulting figures are made available for stereoscopic effects by taking two similar figures and inverting one of them, so that each half figure becomes associated (in the stereoscope) with the complementary half of the other figure.—*Mr. Charles E. Benham:* Stereoscopic effect of twin-elliptic figures.

Cambridge Scientific Instrument Co.: The Cambridge patent extensometer. No mirrors or microscopes are used for magnifying the movement, but the extension of the test-piece is measured by a micrometer screw and a modified form of contact measurement. The instrument is made in two separate pieces; the lower piece carries the micrometer screw shown in Fig. 2, and the upper piece carries a spring tongue. These are fixed to the test-piece by pressing the conical points of hard steel rods into centre punch marks in the side of the test-piece, these points being mounted in strictly geometric slides. Both the upper and lower pieces are held in the definite positions shown in the illustration. If the test-piece stretches, the upper piece rotates about the conical points in the depressions in the test-piece, and the end of the tongue approaches the point on the micrometer screw head, the upper piece forming a lever. The arms of the lever are such that the part of the tongue opposite the point on the micrometer head moves five times the amount of the extension of the test-piece. By means of an adjustment the ratio of the arms of the lever can be adjusted so that this multiplication of the extension can be made exact. One arm of the lever is the flexible steel tongue which carries a hardened steel knife-edge near its outer end. If the tongue is bent sideways the knife-edge is moved across the hard steel point, which is carried from the centre of the divided head. To adjust the instrument the screw is turned and the point advanced until contact is made. Relative movement of the lower piece carrying the micrometer screw and the tongue is thus measured, and is proportional to the extension of the test-piece. It can, however, be adjusted more accurately by causing the spring to vibrate and noting the sound caused by it touching the point each time it passes over it. If the point is advanced by 1/1000 mm. nearer the screw the sound produced by contact as the spring vibrates is louder, and the final adjustment of the micrometer screw can be made quickly and accurately. The micrometer screw has a pitch of $\frac{1}{2}$ mm., and the head is divided into 100 parts; each division on the head corresponds to an extension of 1/1000 mm., and as the tenths of divisions can be estimated by eye, readings can be taken to 1/10,000 mm., although it is not claimed that the results are trustworthy to this degree of accuracy.

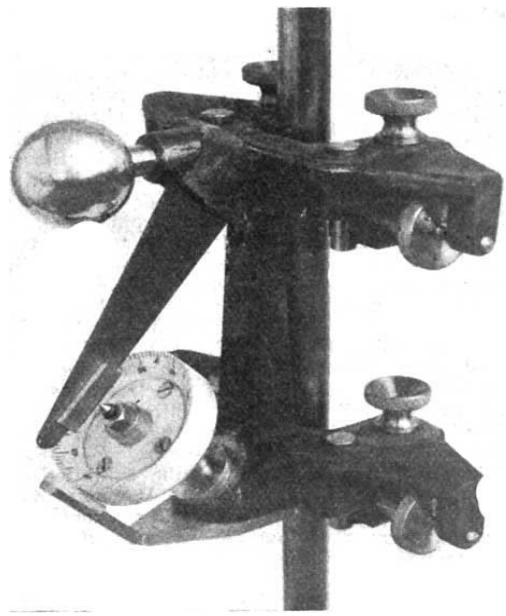

FIG. 2.—Cambridge patent extensometer.

Mr. J. W. Gordon and Mr. H. Fletcher Moulton: A

new object-glass for high-power magnification. The objective exhibited, used with an ordinary eye-piece, constitutes a high-power ocular capable, in combination with an ordinary high-power objective glass, of yielding a perfect image up to magnifications of eight or ten thousand diameters. Being self-contained, that is to say, independent of external influences, it can be used in any position, and is therefore as well adapted to use with the telescope as with the microscope.

Mr. J. E. Barnard: Mercury vapour lamps for microscopic illumination. Mercury vapour lamps have considerable advantages as illuminants for microscopic work, as their visible spectrum consists chiefly of three bright lines, one each in the orange, green, and blue-violet. It is therefore possible, by using suitable absorbent colour screens, to transmit only one bright line of the required colour, the remaining ones being absorbed. The source of light then becomes truly monochromatic, and is practically of one wave-length.—*Mr. Conrad Beck:* (1) Diffraction patterns (antipoints) of point source of light viewed under the microscope with apertures of different shapes illustrating the influence of the aperture shape on microscopic resolution; (2) living bacteria, shown on a dark ground with 1/12 oil immersion lens visible by their own reflected light.

Prof. T. Turner: Transparent films of silver and other metals. Gold leaf supported on a glass plate and heated to about 550° C. loses its green colour and transmits white light. Silver leaf heated in air or oxygen to 400° C. becomes remarkably transparent, transmitting white light. The action begins at about 250° C. Copper leaf remains opaque if heated in a reducing atmosphere to 500° C. When heated in air for about an hour to 250°, or for a much shorter time to higher temperatures, the copper becomes transparent and transmits a brilliant green light. This colour continuously darkens with further heating. Aluminium leaf does not become transparent either in an oxidising or reducing atmosphere. Dutch metal skeletonises, but remains opaque.—*Mr. S. D. Chalmers:* Models illustrating refraction at plane and spherical surfaces. These models illustrate the influence of reduced velocity in glass on the form or direction of waves. The curvatures of the incident and refracted waves are indicated by flexible rods; the paths from a point on the incident to the corresponding point on the refracted wave are indicated by cords of constant length.

Dr. W. J. Russell, F.R.S.: Pictures showing the action of various coals on photographic plates in the dark. These pictures of different coals were obtained by cutting vertical sections of the coal and laying them on a photographic plate in the dark, at a temperature of about 50° C., for seven to twenty-four hours. The photographic plate was then developed, and the picture printed in the ordinary way.—*Prof. J. Symington, F.R.S., and Dr. J. C. Rankin:* A series of skiagrams illustrating the development of teeth in man. The skiagrams were taken from one lateral half of a series of skulls aged from birth up to puberty.

Mr. S. Cowper-Coles: (1) Specimens of bimetallic parabolic mirrors made by electro-deposition. The parabolic mirrors are composed of bands of yellow and white metal, and are made by a combined process of electro-deposition and spinning. (2) Specimens of pure electrolytic iron. Pure electrolytic iron sheets made direct in one operation by a process of electro-deposition from pig iron or ore without any rolling, with a tensile strength of about thirty tons to the inch; the iron is free from crystalline structure.—*Mr. F. W. Aston:* New dark space in helium. The tube exhibited contained helium at a pressure of about 3 mm. It was provided with aluminium electrodes, the kathode being a large flat place A continuous current of low density was passed thro Under these conditions the "Crookes dark space" is defined and filled with a greenish glow, while next to kathode is seen a narrow region of intense darkness sharp defined. The fall of potential across this "new dark space" appears to be invariably about 30 volts.—*Dr. J. A. Fleming, F.R.S.:* (1) Apparatus for exhibiting photo-electric effects with potassium-sodium alloy. The alloy was enclosed with an insulated platinum plate in an exhausted tube. When the plate and alloy were connected to a galvanometer and the surface of the alloy illuminated by an arc lamp, an E.M.F. of about 0·8 volt was created, and a current produced in the circuit by the light. (2) Oscillation valves or glow-lamp electric-wave detectors used for receivers in long-distance wireless telegraphy. It was shown by the exhibitor in 1904 that a carbon filament glow-lamp, having in its bulb a metal cylinder surrounding the filament carried on an insulated terminal, could be used in combination with a galvanometer or telephone as a wave detector in wireless telegraphy, owing to the emission of negative electricity from the incandescent carbon. Such a device was named by him oscillation valve, and is a very sensitive long-distance receiver. Glow-lamp detectors of the type exhibited have been used as receivers in Transatlantic wireless telegraphy, and are also of use as receivers for wireless or radiotelephony. (3) A recent form of cymometer or instrument for measuring the length of the waves radiated by, and the damping of the oscillations in radiotelegraphic antennæ.—*Mr. L. H. Walter:* (1) Tantalum wave-detector for wireless telephony or telegraphy. A tantalum wire point dipping into mercury is spontaneously restoring. At 450 miles, using less than 2 kilowatts, the results equal those of the electrolytic detector. The sound is louder than with the electrolytic when the signals are not too weak. (2) New electrolytic signalling key. A water-cooled signalling key for higher powers (2 kilowatts upwards). A local key circuit actuates two valve electrodes, normally separated, and having the whole primary voltage across them, so that the cell is short-circuited beneath the electrolyte. (3) Model of an experimental form of the exhibitor's magnetic detector of 1906.

The National Physical Laboratory. Mr. A. Campbell: (1) Moving-coil vibration galvanometer. This instrument belongs to the class of tuned galvanometers first introduced by Prof. M. Wien. Its novelty consists in the use of the moving-coil system. (2) Variable mutual inductance standard. Designed for the measurement of small inductances and capacities. (3) Standard of mutual inductance calculable from the dimensions. A small model of the large mutual inductance (10 millihenries) recently completed at the National Physical Laboratory. (4) Secondary standard of mutual inductance (subdivided). *Mr. W. Rosenhain:* (5) Quenching apparatus for metallographic specimens, for quenching small specimens of metal *in vacuo* without removing them from the furnace. *Mr. W. Rosenhain, Mr. F. C. A. H. Lantsberry, and Mr. P. A. Tucker:* (6) Composite photomicrographs representing relatively large areas of steel. *Mr. W. Rosenhain:* (7) Tensile fracture of steel under the Zeiss stereoscopic microscope.—*Rev. F. J. Jervis-Smith, F.R.S.:* Apparatus for generating a luminous glow in an exhausted vessel, moving in an electrostatic field, and exhibiting the action of a magnetic field on the glow so produced (see p. 70).—*Mr. J. T. Irwin:* Hot wire oscillograph.—*Mr. S. G. Brown:* Experiments with a high-frequency alternator.

Mr. R. Threlfall, F.R.S.: Laboratory apparatus for experiments under very high measured pressures and at very high temperatures—pressures up to 100 tons per square inch, temperatures up to 2000° C. Advantage is taken of the practically perfect fluidity of crystalline graphite at high pressures, and of the solidity of compressed magnesia, zirconia, &c., to construct an apparatus on the laboratory scale for such experiments as the possible transformations of carb nder high temperatures and pressures.—*Prof. T. B. W d:* The factors which influence the baking value of wheat flour. The "strength" or baking value of wheat is determined by two main factors:—(1) high diastatic capacity, which continuously produces sugar in the dough, hereby enables the yeast to keep up a continuous tion of carbon dioxide; (2) suitable concentration of and salts in the flour, which affects the physical properties of the gluten, and hence the shape of the loaf. -*Dr. T. E. Thorpe, F.R.S.:* (1) Apparatus and specimens used in connection with the determination of the atomic weight of radium; (2) glass and quartz vessels coloured under the influence of radium.—*Sir William Crookes, F.R.S.:* Scandium, its salts, and its position in the scheme of the chemical elements. Scandium is an exceedingly rare terrestrial element, occurring in very few minerals and in very small amount—usually not more than 0·01 per cent. The one exception is the rare mineral wiikite, which contains scandium in considerable quantity. Astronomical

research has demonstrated the presence of scandium in comparative abundance in the sun and some of the brighter stars. To enable its spectrum lines to be identified with certainty, especially in some of the fainter celestial bodies, a thorough examination of its spectrum has been undertaken.—*Messrs. Johnson, Matthey and Co., Ltd.:* (1) Apparatus in transparent fused silica; (2) various vessels of pure iridium.

Miss Amy Barrington and Prof. Karl Pearson, F.R.S.: Specimens of the hair of chestnut horses. Samples of hair from the ribs, mane, and tail of chestnut horses to show:—(1) the wide range of chestnut coats; (2) that "chestnut" is not a simple unit character; and (3) that the mane and tail of chestnuts can be sensibly black.—*Marine Biological Association of the United Kingdom:* (1) Living representatives of the Plymouth marine fauna; (2) photographs illustrating methods of dredging and trawling (North Sea investigations).—*The Grouse Disease Commissioners:* Specimens illustrating certain aspects of the work of the Grouse Disease Committee, 1905–8. A committee of inquiry into the causes of disease in the red grouse (*Lagopus scoticus*) was constituted in 1904 at the suggestion and under the chairmanship of Lord Lovat; the work and results, of which the exhibit represented a part, will be published by the Zoological Society of London.—*Mr. C. Gordon Hewitt:* The large larch saw-fly (*Nematus erichsonii*, Hartig). The larch saw-fly has increased during the last few years to so great an extent in many of the large larch plantations in Cumberland as to become a serious pest. Many hundreds of acres of larches were completely defoliated in 1907. Except in the young plantations, it will be necessary to rely on natural means of control, of which birds and voles are at present the most important.—*Mr. F. Enock:* Living specimens of Mymaridæ-ovivorous parasites (new to Great Britain).

Prof. R. T. Hewlett and Mr. J. E. Barnard: A method of disintegrating bacterial and other cells. The machine consists of a phosphor-bronze vessel, revolving at a high speed, containing hardened steel balls, which are kept in position at the periphery of the vessel by a central steel cone. By retarding the revolution of the central cone, a drag is put on the balls, so that a grinding action takes place between them and the internal surface of the vessel. Rise of temperature is prevented by the use of liquid carbonic acid or other means.—*Dr. Ernest F. Bashford, for the Executive Committee, Imperial Cancer Research Fund:* Cancer as a manifestation of cell-life throughout the vertebrates, and the biological properties of cells which have become cancerous.—*Prof. W. B. Bottomley:* Bacterial treatment of non-leguminous plants. (1) Specimens showing effect of nitrogen-fixing organisms upon growth of oats, barley, turnips, radishes, tomatoes, &c.; (2) cultures and microscopical preparations of nitrogen-fixing bacteria (*Pseudomonas radicicola, Azotobacter beyerinckii*, &c.).

Prof. J. Milne, F.R.S.: Seismograms recorded by a Milne seismograph in the Isle of Wight. (1) These seismograms illustrate the difference in character of records obtained from the same instrument. The Mexican earthquake of March 26, 1908, was obtained on *quickly* running paper. The earthquakes of August 9, 1901, were obtained on *slowly* moving paper. In the former halation effects do not eclipse the first preliminary tremors, and an open diagram is obtained. (2) The three earthquakes which occurred on August 9, 1901, indicate the value of seismograms in correcting cablegrams. The interval of time between the preliminary tremors and the maximum motion shows that the origins of the first and third disturbances were 6000 miles distant, while the second was nearly 7000 miles distant. The first and last came from Japan, while the second came from the East Indies. In American and European newspapers it seems to have been universally stated that the origins were in Alaska.—*Dr. C. W. Andrews, F.R.S.:* Restored model of the skull and mandible of *Prozeuglodon atrox*. *Prozeuglodon atrox* is a primitive whale (Zeuglodont), and is one of the forms which unite the true Zeuglodonts with the early land-carnivores known as Creodonts.—*Mr. J. Y. Buchanan, F.R.S.:* Features of land-ice illustrated by photographs and stereoscopic slides in the taxiphote. These slides, taken last winter in the grotto of the Morteratsch glacier, illustrate the internal structure of the ice in winter.—*Mr. A. Hutchinson:* Protractors for constructing stereographic and gnomonic projections of the sphere. The protractors exhibited are intended for the use of students of crystallography, and are designed to facilitate the construction of great and small circles in the stereographic projection.

Mr. Henry Balfour: Stone implements of very early date from the Zambezi River and some of its tributaries. A large proportion of the implements of chalcedony, quartzite, &c., are of forms exactly similar to types characteristic of the river-drift period of western Europe and Great Britain. These were found associated with, and evidently forming part of, ancient terrace gravels deposited as drifts by the Zambezi at a remote period. Several implements were found by excavation in undisturbed gravel deposits at depths varying from 6 inches to 2 feet.—*Prof. W. M. Flinders Petrie, F.R.S.:* Drawings of ancient zodiacs.—*Prof. W. Gowland, F.R.S.:* Megalithic monuments in Japan (see NATURE, February 14, 1907, vol. lxxv., p. 382).—*Mr. Francis Fox:* The saving of Winchester Cathedral and other ancient buildings. (1) Specimens of the beechwood logs on which the cathedral stands; (2) block of the peat found beneath the walls, in some cases 8 feet in thickness; (3) sample of the gravel bed down to which the underpinning is carried by a diver; (4) old box-wood rule found during the operations.—*Mr. J. Gray:* An instrument for measuring the colour of the hair, eyes, and skin (NATURE, February 27, vol. lxxvii., p. 406).

Prof. Silvanus P. Thompson, F.R.S.: Drawings of early compass cards and windroses. The compass card was developed from windroses drawn on the Portulani, or sailing charts, at the points of intersection of the loxodromic lines. The drawings shown were from old Portulani or other early works dating from 1375 to 1584.—*Messrs. T. and R. Annan and Sons:* Photographs of Lord Kelvin.—*Mr. J. Stewart, Largs:* Photographs of Lord Kelvin, and relating to him.

Prof. A. H. Church, F.R.S.: Documents and specimens of historical interest referring to the Royal Society, including an unpublished letter of Captain James Cook, F.R.S., the circumnavigator, dated Rio de Janeiro, September 30, 1768, and seventeen portrait medals, struck at the Paris mint, of foreigners who were members of the Royal Society.

Messrs. B. J. Hall and Co., Ltd.: Ordoverax copying process. This process is one for rapidly and accurately producing facsimile copies of line drawings and tracings on any materials. The original is first copied on ferro-prussiate paper; the copy is placed before development, face downwards, on a plate of ordoverax composition previously prepared. The portions of the ferro-prussiate paper not affected by light act upon the ordoverax composition, causing it to take up printers' ink from a roller, whereas the parts of the plate not so acted upon do not take up any ink.—*Mr. Donald Cameron-Swan:* A new method of reproducing pencil and other drawings. This method (which is being employed for the Memoirs of the National Antarctic Expedition) differs from most photomechanical processes of reproduction in that the drawings are reproduced in exact facsimile, without any background of tone where none exists in the originals.

NOTES.

THE British associates and correspondants of the Institute of France will attend at St. James's Palace on Wednesday next, May 27, at 11 a.m., to present an address to the President of the French Republic on the occasion of his visit to this country.

THE Royal Society of London invites applications for two Mackinnon research studentships, each of the annual value of 150*l*. These studentships, which are restricted to British subjects, are offered for the purpose of researches in physical and biological sciences, one being awarded for research in the group of the physical sciences, including astronomy, chemistry, geology, mineralogy, and physics, the other for research in the group of the biological sciences, including anatomy, botany, palæontology, path-